GCSE DESIGN AND TECHNOLOGY

(8552)

We study the course from an exam board. In the case of DT this is AQA.

Use their websites to support your revision.

This presentation is a guide to explain how their examinations work.

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Year 10 – Mock Examination

AQA Realising potential

Throughout this year, we have worked hard to cover the information that is required for the examination.

You will complete a 2 hour examination, which is broken up as follows.

2.2 Assessments

Paper 1
What's assessed • Core technical principles • Specialist technical principles • Designing and making principles In addition: • at least 15% of the exam will assess maths • at least 10% of the exam will assess science.
How it's assessed • Written exam: 2 hours • 100 marks • 50% of GCSE
Questions **Section A – Core technical principles (20 marks)** A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding. **Section B – Specialist technical principles (30 marks)** Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles. **Section C – Designing and making principles (50 marks)** A mixture of short answer and extended response questions.

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3.1 Core technical principles

In order to make effective design choices students will need a breadth of core technical knowledge and understanding that consists of:

- new and emerging technologies
- energy generation and storage
- developments in new materials
- systems approach to designing
- mechanical devices
- materials and their working properties.

All of this section must be taught and all will be assessed.

- The first section is multiple choice.
- We are well rehearsed with these type of questions.
- We have done them on our end of term tests.
- We have covered much the learning throughout the year. However some areas we have not…
- Here are some examples and strategies how to answer them

These questions will not be in your paper.

0 1 Which type of renewable energy is sourced from plants?

A Biomass ⬭

B Solar ⬭

C Tidal ⬭

D Wind ⬭

This one should have been straightforward. Although we haven't covered biomass in great detail, we know it's not the other 3, which we have covered in more detail.

Use your common sense.

0 3 What is the electrical component shown in **Figure 1** used for?

Figure 1

A To detect pressure levels ⬭

B To detect temperature levels ⬭

C To switch equipment on or off ⬭

D To switch the direction of a motor ⬭

Again we haven't done much work on electronics this year, however, I am sure you have all seen a switch before.

c. To switch equipment on or off.

0 6 'Technology push' describes when products are developed

A due to improvements in new materials. ⬭

B due to increased consumer demand. ⬭

C in response to consumer feedback. ⬭

D with the user in mind. ⬭

We have actually covered this area, but only briefly. So some will know it straight away

The strategy here is to use the words, in this case 'Technology Push', decipher what it means and see which answer best fits.

If you are pushing something, you are driving something forward.

If you were pushing technology forward, it wouldn't be old tech, so

A. Due to improvement in new materials

1 1 . 1 Name **one** alloy.

[1 mark]

Brass

1 1 . 2 Explain why metals are alloyed.

[2 marks]

2 Materials will give enhanced Properties

Become more corrosion resistant

Can improve working properties

Can improve appearance

These will usually be some simple low mark questions. We will have covered this in lessons.

Make sure you put sufficient detail in all your answer.

If there are 2 points, give 2 markable points.

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This section is categorised through a variety of materials. We have predominately studied wood. We have covered metals and plastics also. But whenever the opportunity arises. Answer the questions about timber based materials.

The following slides show some examples of the type of questions you may have to answer

3.2 Specialist technical principles

In addition to the core technical principles, all students should develop an in-depth knowledge and understanding of the following specialist technical principles:

- selection of materials or components
- forces and stresses
- ecological and social footprint
- sources and origins
- using and working with materials
- stock forms, types and sizes
- scales of production
- specialist techniques and processes
- surface treatments and finishes.

Each specialist technical principle should be delivered through **at least one** material category **or** system. Not all of the principles outlined above relate to every material category or system, but all must be taught.

The categories through which the principles can be delivered are:

- papers and boards
- timber based materials
- metal based materials
- polymers
- textile based materials
- electronic and mechanical systems.

1 6 Choose one of the addition processes in the table below.

Lamination	Printing	Sewing	Soldering	Welding

My chosen process is _____

In the box below, use notes **and** sketches to describe your chosen process.

Identify the equipment used in your chosen process.

[6 marks]

Which one of these processes is linked to timber based materials?

Correct - Lamination

Lamination: Think about the process and include as many key words as you can. You need 6 markable points.

Compression

Layers of veneer

Clamps

PVA adhesive

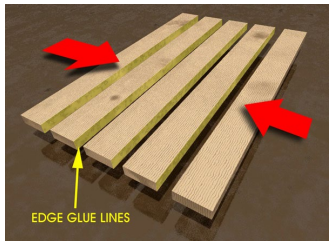
Strength

Former

Under pressure

Bag press

Curves



Edge to edge

2 0 The design and manufacture of products has an effect on our planet and environment.

Analyse and evaluate the issues a consumer may consider before deciding to purchase products.

Give examples in your answer.

[8 marks]

There is often a question about the environment. Relate it to what you may know. Notice the 8 marks.

A Hummer 6.2 litre V8 or an electric Tesla.

Lets discuss the ecological issues when buying a car. Then try to answer the question.

1 7 Name one process used to remove waste material to make different parts of a prototype. Describe the process you have chosen.

[3 marks]

Name of process Sawing

Description of chosen process

Name the type of saw

Name the material cutting through

Name the direction of the cut

Name an alternate way of doing the process.

Again, think about the box process…

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This section is the largest section of the exam.
It will include questions about all the generic areas of the subject.
It will also have questions linked to both Maths and Science.

The following slides show some examples of the type of questions you may have to answer

3.3 Designing and making principles

Students should know and understand that all design and technology activities take place within a wide range of contexts.

They should also understand how the prototypes they develop must satisfy wants or needs and be fit for their intended use. For example, the home, school, work or leisure.

They will need to demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas:

- investigation, primary and secondary data
- environmental, social and economic challenge
- the work of others
- design strategies
- communication of design ideas
- prototype development
- selection of materials and components
- tolerances
- material management
- specialist tools and equipment
- specialist techniques and processes.

Don’t be afraid of new words

2 3 Designers often collaborate.

Discuss the importance of collaboration in creating effective design solutions.

Give examples to support your answer.

[6 marks]

This is often a design process like, how do we research or list specification points.

2 4 Give **five** safety precautions a user needs to consider when using any cutting tools.

[5 marks]

1 _____

_____

2 _____

_____

2 5 . 1 Explain why surface finishes are applied to materials and fabrics for aesthetic reasons.

Give examples in your answer.

[3 marks]

Some questions are worded differently, but look the same

2 5 . 2 Explain why surface finishes are applied to materials and fabrics for functional reasons.

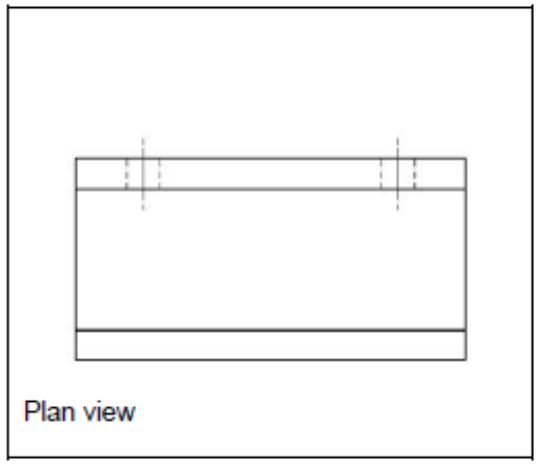
Give examples in your answer.

[3 marks

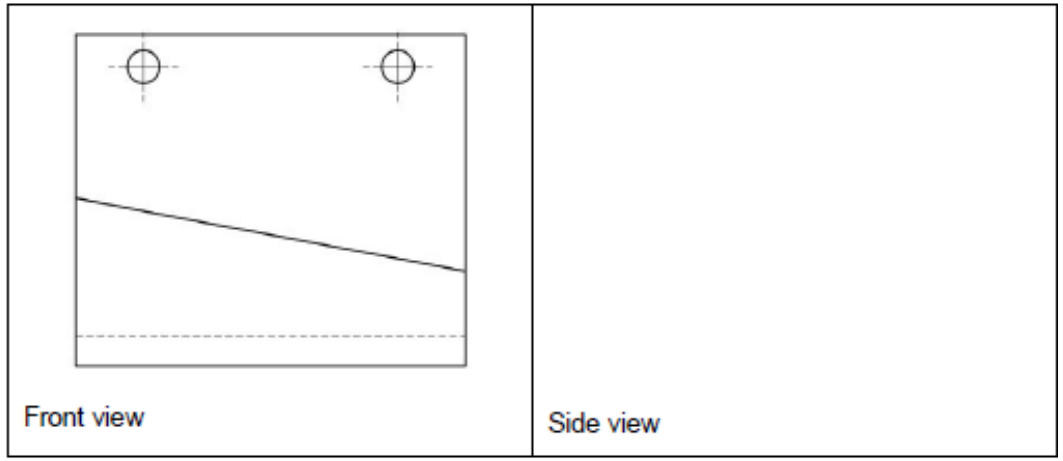
Be aware of the amount of marks for each question. Make sure you make a sentence or comment per mark. 6 marks, 6 sentences, or 3 sentences with justification

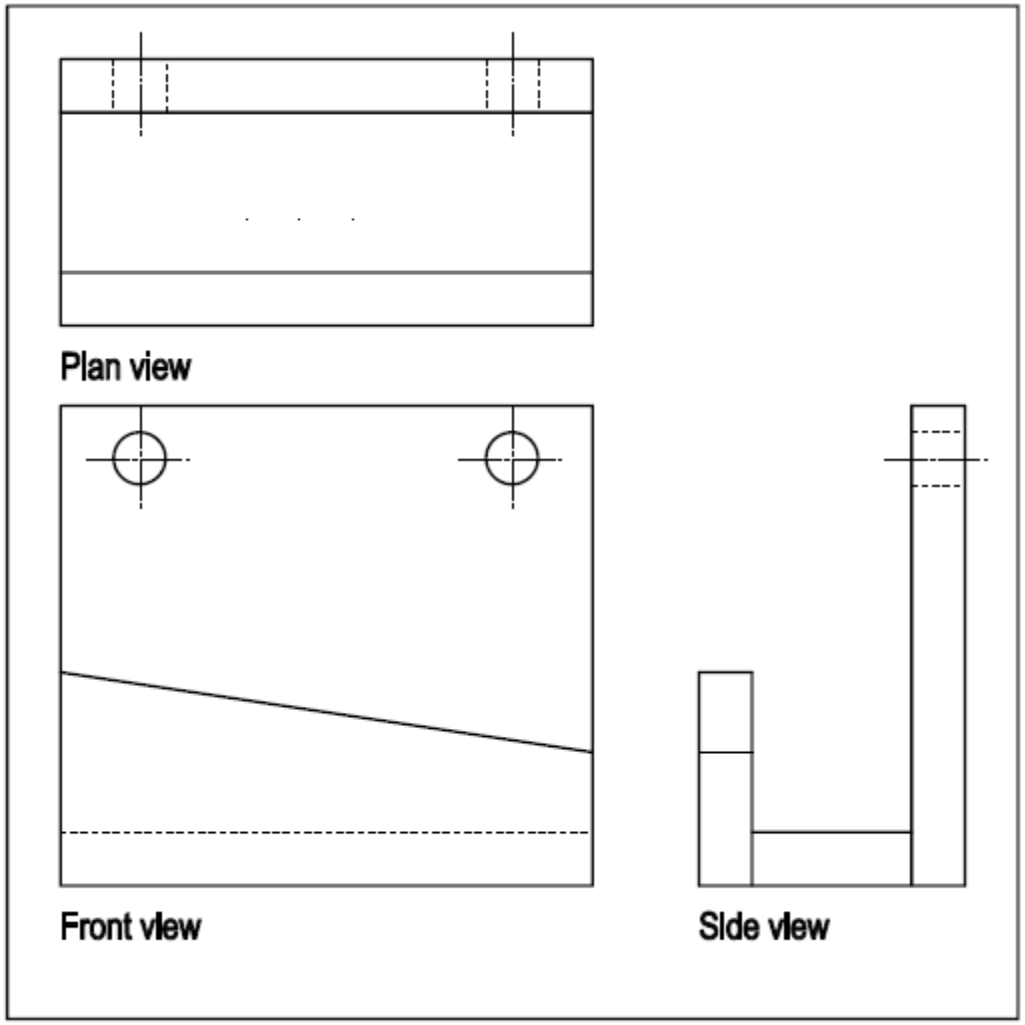
Make sure you have enough detail in your answers and try to answer the question, even if you are not sure exactly what to do. An educated/sensible guess usually carries some marks.

There will be a drawing question:

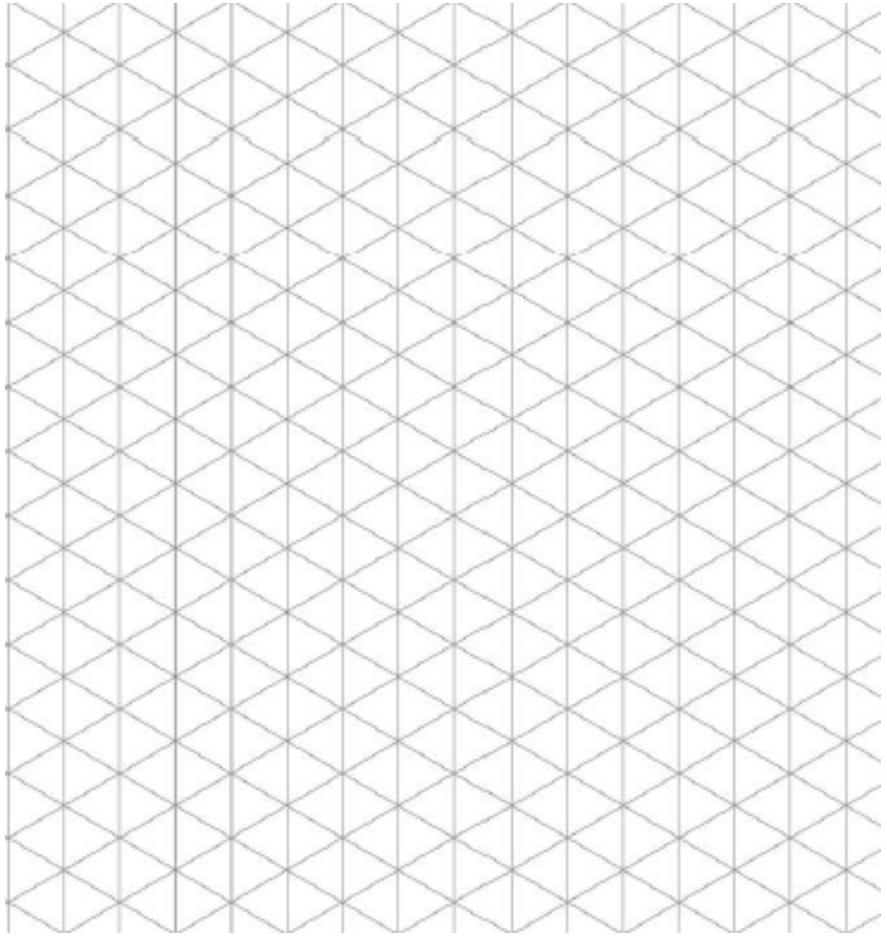


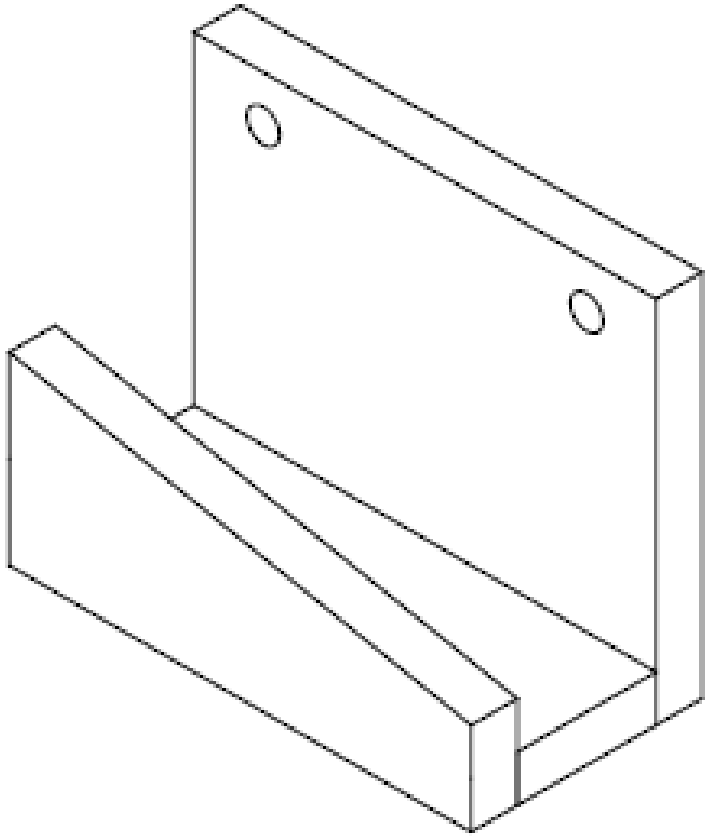
In this case, finish the side view.





Then it was a case of drawing it in isometric – a grid was provided.





Other drawing styles include, oblique, single point, two point and orthographic

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15% of the paper is Maths. It is all GCSE grade 5 maths – so you should know it.

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7.1 Links to maths

Students must be able to apply the following mathematical skills.

1 Arithmetic and numerical computation

Ref	Mathematical skills requirements	Examples of design and technology applications
1a	Recognise and use expressions in decimal and standard form.	Calculation of quantities of materials, costs and sizes.
1b	Use ratios, fractions and percentages.	Scaling drawings, analysing responses to user questionnaires.
1c	Calculate surface area and volume.	Determining quantities of materials.

2 Handling data

Ref	Mathematical skills requirements	Examples of design and technology applications
2a	Presentation of data, diagrams, bar charts and histograms.	Construct and interpret frequency tables; present information on design decisions.

3 Graphs

Ref	Mathematical skills requirements	Examples of design and technology applications
3a	Plot, draw and interpret appropriate graphs.	Analysis and presentation of performance data and client survey responses.
3b	Translate information between graphical and numeric form.	Extracting information from technical specifications.

4 Geometry and trigonometry

Ref	Mathematical skills requirements	Examples of design and technology applications
4a	Use angular measures in degrees.	Measurement and marking out, creating tessellated patterns.
4b	Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects.	Graphic presentation of design ideas and communicating intentions to others.
4c	Calculate areas of triangles and rectangles, surface areas and volumes of cubes.	Determining the quantity of materials required.

Maths Example 1

1 2 . 2 **Table 1** shows the number of food and drink containers successfully recycled by a manufacturer in 2010 and 2017.

Table 1

Recycling of composite food and drink containers	
2010	**2017**
32 billion tonnes	46 billion tonnes

What is the percentage increase in recycling of composite food and drink containers between 2010 and 2017?

[2 marks]

Answer _____

Table 1 shows the number of food and drink containers successfully recycled by a manufacturer in 2010 and 2017.

What is the percentage increase in recycling of composite food and drink containers between 2010 and 2017?

1 mark	For recognising a 14 billion tonne increase in containers recycled ie 46-32 billion tonnes
1 mark	14 ÷ 32 × 100 = 43.75% Accept 43.8%

Alternative method

1 mark	46 ÷ 32 = 1.4375
1 mark	Answer 43.75% Accept 43.8%

2 2 The step ladder in **Figure 4** has 12 steps. Each step is 275 mm long, 100 mm wide and 25 mm thick.

Figure 4

2 2 . 1 Each step should be 275 mm long.

The manufacturing tolerance is +/–0.5%

Calculate the maximum and minimum length of each step to two decimal places.

[2 marks]

Maths Example 2

1 mark each for maximum and minimum lengths

Maximum length will be (275 + 1.375) = 276.375 mm
Rounded to 276.38/ 276.38mm for mark

Minimum length will be (275 – 1.375) = 273.625mm
Rounded to 273.63/273.63mm for mark

1 mark for each step below up to a maximum of 3

1. Material used for 12 steps is 12 x 0.275 = 3.3 m or 3300mm
2. Waste is 3.6m – 3.3m = 0.3m or 300mm

   Or

   3300/3600 = 0.9167 (amount used for steps)
3. Percentage waste is (0.3/3.6) x 100 = 8.33%

If correct answer is arrived at then award all 3 marks even if steps 1 and/or 2 are not evident.

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10% of the paper is Science. It is all GCSE grade 5 also – so you should know it.

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7.2 Links to science

Students must know and apply the following scientific knowledge and skills.

1 Use scientific vocabulary, terminology and definitions

Ref	Scientific knowledge and skills requirements	Examples of design and technology applications
1a	Quantities, units and symbols.	Appropriate use of scientific terms when developing a design brief and specifications.
1b	SI units (eg kg, g, mg; km, m, mm; kJ, J), prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano).	Calculation of quantities, measurement of materials and selection of components.
1c	Metals and non-metals and the differences between them, on the basis of their characteristic physical and chemical properties.	Classification of the types and properties of a range of materials.

2 Life cycle assessment and recycling

Ref	Scientific knowledge and skills requirements	Examples of design and technology applications
2a	The basic principles in carrying out a life-cycle assessment of a material or product.	Selection of materials and components based on ethical factors, taking into consideration the ecological and social footprint of materials.

3 Using materials

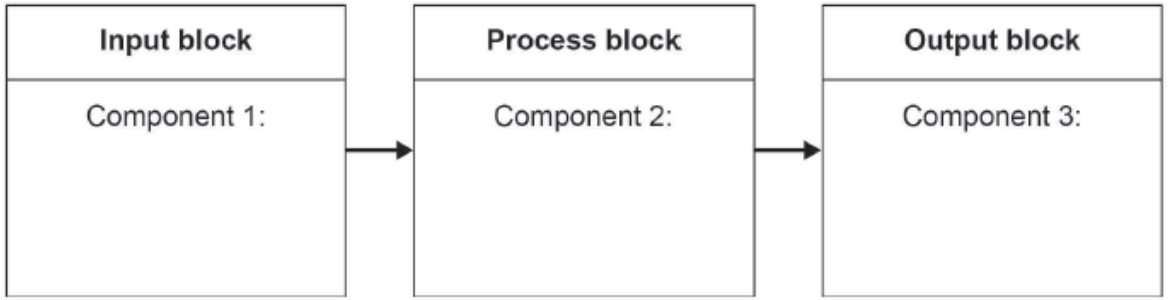
Ref	Scientific knowledge and skills requirements	Examples of design and technology applications
3a	The conditions which cause corrosion and the process of corrosion and oxidisation.	Understanding of properties of materials and how they need to be protected from corrosion through surface treatments and finishes. Appreciate how oxidisation can be used when dyeing materials.
3b	The composition of some important alloys in relation to their properties and uses.	Selecting appropriate materials.
3c	The physical properties of [materials], how the properties of materials are selected related to their uses.	Knowledge of properties of materials to be applied when designing and making.
3d	The main energy sources available for use on Earth (including fossil fuels, nuclear fuel, bio-fuel, wind, hydro-electricity, the tides and the Sun), the ways in which they are used and the distinction between renewable and non- renewable sources.	Understanding of how to choose appropriate energy sources.
3e	The action of forces and how levers and gears transmit and transform the effects of forces.	Knowledge of the function of mechanical devices to produce different sorts of movement, changing the magnitude and direction of forces.

1 3 **Figure 4** shows a system diagram for an alarm.

Complete the diagram by naming **one** component that could be used in **each** block.

[3 marks]

Figure 4



Even if you only know 1 or two of these, you will still get marks for them

Suitable inputs	Suitable processes	Suitable outputs
• Light sensors • Temperature sensors • Pressure sensors • Switches • Pressure pad **Accept any switch/sensor used to activate or deactivate system, eg:** • PIR sensor • Sensor + qualification • Motion sensor • SPST switch • Key switch • Reed switch • Key pad	• Microcontrollers • Timers • Decision making **Accept trade names for specific components and:** • PIC chip • Genie chips • Picaxe • Arduino • Crumble • Genie • Counter • Transistor • Microprocessor • Transistor • Time delay • Monostable • Astable	• Buzzers • Speakers • Lamps **Accept specific components:** • Bell • LED • Siren • App notification on phone

1 5 Study the high chair in **Figure 2**.

Figure 2

Identify the force acting upon each of the following **three** parts of the high chair when in use.

[3 marks]

Legs _____

Seat _____

Straps _____

1 mark for each correctly named force up to a maximum of 3 marks

Indicative content:

Legs: bending **or** compression

Seat: compression

Straps: tension

Even if you only know 1 or two of these, you will still get marks for them

Most Important

Have a go!

You can’t get marks for nothing – you have to write something

The exam accounts for 50% of your final grade this year

This mock exam will determine your predicted grades next year

If you finish early – review the paper

Enhance images and add detail to any short sentences.

Each Mark is worth just under 1 minute of your time – don’t waste time on low mark answers.

GOOD LUCK